

Since nothing has been hitherto observed of the development of starch and chlorophylle, it is sufficient here merely to state the fact as authentic in the cells of *one* plant. I intend at a future period to publish some other facts on the development of these two elementary structures and their mutual relation, and wish that other microscopical inquirers would direct their attention to this point, for it is indeed only occasionally, that one meets with useful facts.

The origination of caoutchouc appears first to take place where the amyllum and chlorophylle formation is completed. It is there that I first find the little granules in the cell-contents with certainty, and from there first it visibly coagulates in water.

XXIX.—*Botanical Notices from Spain.*

By MORITZ WILLKOMM*.

[Continued from p. 120.]

No. X. MALAGA, May 30th, 1845.

AFTER spending several days in the little town of San Roque, situated two leagues distant from Gibraltar, I proceeded along the coast towards Malaga, where I arrived on the 19th of April. The vegetation of the hilly country of San Roque is, in its principal features, perfectly similar to that of Algeciras. All the hills are thickly covered with *Calycotome villosa*, Lk., here and there alternating with large patches of *Lavandula Stœchas*, L. The high plains on the north and west of the town, which separate this hilly district from the valley of the Rio Guadarranque, are mostly covered with *Quercus humilis*, Lam., which is here very common, but appears seldom to flower; at least I have hardly obtained ten specimens in flower. On these high plains *Cistineæ* occur in abundance, especially *Cistus crispus*, L., *C. albidus*, L., *Helianthemum salicifolium*, P., *H. guttatum*, P., and others; further, *Ornithopus compressus*, L., *Ranunculus flabellatus*, Desf., *Uropetalum serotinum*, K., several *Orchideæ*, *Erodia*, &c. The most important botanical localities in the environs of S. Roque are—the oak-woods stretching out in a north and west direction and watered by the Guadarranque, the sandstone hills rising on the other side of that river, a branch of the Sierra de Gazales and Monte Almoráima, a sandstone mountain lying between the bay and the sea. In the rocky clefts of this mountain occur the pretty *Anthericum bicolor*, Desf., not unfrequent, besides numerous *Cistineæ*: as *C. albidus*, *crispus*, *populifolius*—upon the roots of which I observed here *Cytinus hypocistis*,—*Helianth. halimifolium*, and especially *H. Tuberaria*, P.; besides *Anemone palmata*, L., *Ranunculus flabellatus*, *Passerina villosa*, *Tulipa Celsiana*, and on moist localities on the broad coomb

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extending from the Almoráima towards the north, the *Ranunculus hederaceus*, L., which is rare in Spain. In a fine copse lying east of the town I gathered *Serapius Lingua*, L., in great abundance; much rarer occurs among it the splendid *Serapius cordigera*, L., some specimens of which I also observed on the sandstone hills lying on the other side of the Guadarranque. I also met with *Drosophyllum lusitanicum*, Lk., a second time in company with the same *Helianthemum* with which I had before observed it in the mountains of Algieras. The oak-woods of S. Roque were chiefly composed of *Qu. Suber*; only along the river stretches a broad strip of *Qu. lusitanica* β . *batica*, mixed with *Fraxinus excelsior*. On the banks of the river grow *Nerium Oleander*, *Tamarix africana*, *Euphorbia palustris*, &c. in abundance, and the numerous ponds along the banks are filled with *Nasturtium officinale*, *Iris Pseudacorus* and a *Callitriche*. Further occur in these woods *Ruscus aculeatus*, L., *Anemone palmata*, L., *Ranunculus trilobus*, Desf., *Ficaria ranunculoides*, &c. I have in vain sought for *Salvia batica*, Boiss., which is said to occur in these woods; probably it does not flower till summer. On clayey fallow land in the environs of S. Roque the *Convolvulus tricolor*, L., and *C. undulatus*, Cav., were already in blossom; among the young corn the flowers of *Gladiolus segetum*, Gawl., and *Papaver Rhæas*, L., were pre-eminently splendid, and the thick hedges of *Pistacia Lentiscus* and *Coriaria myrtifolia*, both now in flower, were thickly interlaced with flowering *Smilax mauritanica* and *Bryonia dioica*. In the hilly land between S. Roque and the peninsula of Gibraltar, where occur *Anthyllis Vulneraria*, L., var. *rubriflora*, *Lupinus angustifolius*, L., several *Hedysara*, *Trixago apula*, Col., *Anchusa italica*, L., *Euphorbia retusa*, Cav., *Cerinth major*, L., &c. in abundance, more rarely *Picridium vulgare*, Desf., there are numerous ponds and bogs in which I met with an *Ænanthe*, together with *Alisma ranunculoides*, L., *Carices* and *Heleocharis palustris*.

As I have already several times remarked, the entire hilly and mountainous district in the province of Cadiz, with the exception of the high limestone mountain of Guazalema extending along its north-eastern limits, consists of sandstone. This formation suddenly ceases after passing the Rio Guadiaro, a large river which springs in the neighbourhood of the town of Ronda, forms the boundary between the provinces of Cadiz and Malaga, and empties itself into the sea at the eastern base of the Almoráima. On its left bank rise lofty limestone mountains, which belong to the wide-spreading Serrania de Ronda. This extensively branched and complicated mountainous district lies between the two rivers Guadiaro and Guadalhorce, which last separates it from the limestone mountains of Antequera and the hilly land of Malaga. The principal chain of the Serrania de Ronda is formed of the high mountains of Yunquera, composed of the older limestone and marble, whose highest summit, called Las Plazoletas, rises to a height of 8000 feet above the level of the Mediterranean. From this principal chain extends a series of craggy, abrupt limestone mountains northwards from 5000 to 6000 feet high, called

Sierra de la Nieve*, which is joined in a western direction by several parallel chains of less height, at whose western foot lies the town of Ronda. Toward the west the Sierra de Yunquera gradually descends to form a spacious high table-land, in which are several small villages, and the western limit of which is bounded by a mountain-chain stretching from the mountains of Ronda along the left bank of the Guadiaro as far as the sea—the Sierra de Gaucin. In a south-eastern direction a mountain-chain proceeds from the high mountains of Yunquera, constituting the Sierra de Tolox and Montes de Pereyla, and terminates on the dolomite mountains of the Sierra de Mijas, nearly 6000 feet high, which extends to the sea and the mouth of the Guadalhorce. Between these dolomite mountains and the mouth of the Guadiaro runs a chain of mountains along the coast of considerable height, forming the southern boundary of the central high plains and the whole Serrania, and whose different parts take, from the valleys of several coast rivers, the names of Sierra de Estepona, Sierra de Marbella and Sierra de Bermeja†. Along this mountain-chain the coast forms a strip of from one to four miles in width, which, as far as the country of the town of Marbella, is comparatively level and covered for the most part with shrubs of various *Cistineæ*, pistachios and dwarf palms; from Marbella onwards, on the contrary, where the mountain recedes further from the coast, this plain passes over into a gradually ascending hilly land.

A number of leguminous plants of the genera *Trifolium*, *Medicago*, *Lotus*, *Lathyrus*, *Astragalus*, *Vicia*, *Hippocrepis*, *Ornithopus*, &c., in company with various *Plantagines*, *Cistineæ*, *Silene* and grasses, were now in flower along the coast in great profusion. In marshy spots on the Guadiaro I found *Ranunculus trilobus*, Desf., plentiful, and on dry grass-plots along the river, *Lithospermum apulum*, Vahl. Along the coast occurred *Erythræa maritima*, P., *Stachys hirta*, L., and on isolated spots the small and tender *Lotus parviflorus*, Desf. Under the bushes, from Estepona onwards, *Genista hirsuta*, Vahl., grows plentifully, and on the hills of Marbella *G. umbellata*, L. In the drift-sand of the coast occur *Medicago marina* and *littoralis*, a small Umbellate, *Plantago Coronopus*, L., various grasses, and between Marbella and Fuengirola a beautiful *Senecio*. On the firmer sand-hills blossomed the beautiful *Statice sinuata*, L., in plenty. In the sunny clefts of limestone rocks around Estepona I found *Lotus edulis*, L., with *Asteriscus maritimus*, Mönch., and *Valeriana Calcitrapa*, L., which is also very common on the thatched roofs in Estepona.

* Boissier in his Voyage confounds the Sierra de Yunquera with the S. de la Nieve, and comprises both chains under the name of Sierra de la Nieve. The inhabitants of the Serrania however distinguish exclusively the lower mountain chain lying to the north of Yunquera by this name.

† The Sierra de Estepona bears also, among the people, the name of Sierra Bermeja, and Boissier, in his Voyage, understands constantly the Sierra de Estepona under the last name. But as he sometimes indicates this chain also by its true name Sierra de Estepona, I think the Sierra Bermeja of Boissier so rich in plants is that indicated by this name on all maps, lying west of the Sierra de Mijas, and saw subsequently, to my great disappointment, that I had been deceived.

The corn-fields were surrounded with *Chrysanthemum coronarium* and *segetum*, L., *Anacyclus clavatus*, P., *A. radiatus*, Lois., and other *Anthemideæ*. Under the bushes, between Estepona and Marbella, as well as in the hilly land lying further eastward, occurs, though rather rarely, the beautiful *Lupinus hirsutus*, L., with *Medicago orbicularis*, L. Lastly appear in the above-mentioned hilly land, *Malva hispanica*, L., *Bupthalmum aquaticum*, L., *Linum strictum*, L., *Lin. narbonense*, L., *Lathyrus purpureus*, Desf., *Tolpis barbata*, Gärtn., a number of *Cistineæ*, and on moist spots, not rarely, the pretty *Imperata*, as well as, under shady bushes by rivulets, *Arum italicum*, L. In the country distant a mile from the south-western foot of the Sierra de Mijas, close to the village of Fuengirola, lying on the shore, the mountain recedes fully ten miles from the coast, so as to form an abrupt angle with the Sierra de Mijas stretching from north-east to south-west. The rugged Sierra Bermeja forms the western bend of this angle, whose highest points may rise about 5000 feet, and which I visited on the 18th of April from Fuengirola. The whole space between the coast, the Sierra Bermeja and Sierra de Mijas, includes a variously intersected hilly land, watered by the Rio Gomenaro, which separates these two mountain-chains, and is almost wholly covered by a dense Monte-bajo often taller than a man, consisting principally of *Helianthemum glutinosum*? P. On the hills close to the foot of the Sierra Bermeja occurs, very rare, *Cistus ladaniferus*, which was just beginning to unfold its large white blossoms, and appeared to be not frequent in the country along the coast, whilst, for instance, it almost wholly covers the Sierra Morena. I also found here and there *Adenocarpus Telonensis*, Gay., in flower. On the rugged walls of rock facing the north and east of the Sierra Bermeja, covered nearly to its top with shrubs, the splendid *Helianthemum atriplicifolium*, W., began to blossom; I likewise gathered *Senecio Doronicum*, L., var. *lanatus*, Koch. The *Echium flavum*, Desf., occurred but very rarely, and in the clefts of rock *Ranunculus gramineus*, L., var. *luzulaefolius*, Boiss.; somewhat more frequent on the rocks of the summit, *Valeriana tuberosa*, DC., and the pretty *Saxifraga gemmulosa*, Boiss. Lastly, I found at several hundred feet below the highest summit on the south side a splendid *Stipa*, and in shady clefts of the rock at the foot of the mountain the delicate *Arenaria retusa*, Boiss. The northern declivity of the chain is for the most part wooded with cork-oaks.

On the following day my way led me through the lowest and most southern part of the Sierra de Mijas, as this mountain-chain between Fuengirola and Torremolinos stretches to the sea, and in part descends abruptly in rocks into the sea. In corn-fields around Fuengirola I for the first time observed *Vicia vestita*, Boiss., which occurs very plentifully in the environs of Malaga. On the rocky high table-land between Torremolinos and Chuniana blossomed *Cladanthus proliferus*, DC., in company with *Anacyclus clavatus*, P., *Galactites tomentosa*, Mnch., and *Phlomis purpurea*, L., in great abundance. The last is one of the commonest plants of the warm region in Andalusia.

Before speaking of the environs of Malaga, I will endeavour briefly to describe the rich and interesting vegetation of the lofty mountains of Yunquera, which I had an opportunity of investigating during a sojourn of several days at the end of April. The little town of Yunquera lies in an almost circular expanse, surrounded by one of the branches of the Serrania, close to the foot of the steep mountain of the same name. From the mountains of Ronda a branch runs in a north-eastern direction as far as the Guadalhorce, which bounds the wide valley of Yunquera north and east, and forms between this place and the river two parallel chains of 5000 to 6000 feet high, bearing the names of Sierra Blanquilla and Sierra Prieta. Both these chains consist of limestone, and are remarkable for their sterility and nakedness. In one of the valleys running in a southern direction lies the village of Alozáina, through which the road leads from Malaga to Yunquera, and is separated from the Guadalhorce by an undulating hilly land. In these hills I observed large tracts wholly overgrown by *Convolvulus tricolor*, L., *C. undulatus*, Cav., and *Lavatera trimestris*, L.; on dry stones, plots of grass, and under shrubs in sunny spots blossomed *Cleonia lusitanica*, L., *Salvia viridis*, L., *Teucrium pseudo-chamapitys*, L., *Asperula hirsuta*, Desf., *Micromeria græca*, Bth., β . *latifolia*, Boiss.; in corn-fields *Ornithogalum narbonnense*, L., and a *Phalaris*; and by the road-side *Galactites tomentosa*, *Ormenis mixta*, DC., *Micropus supinus*, L., *Plantago Serraria*, L., *P. albicans*, L., &c. Upon walls and rocks at Alozáina the pretty blue-flowered *Umbilicus hispidus*, DC., is very common, as also on the rocks in the valleys of the Sierra Prieta, which the road crosses. In shady places we meet with isolated specimens of *Sarothamnus affinis*, Boiss. (*Cytisus affinis*, Brot.). Near Yunquera is a rocky eminence, upon which stands an old watch-tower, one of the few habitats of the rare *Digitalis laciniata*, Lindl., which unfortunately was not yet in flower. Here, and throughout all the rocky district of Yunquera, the pretty large-blossomed *Erodium guttatum*, W., is found plentifully. In the same undeveloped state as *Digitalis laciniata* I met with two of Boissier's choice plants, namely *Linaria Clementei* and *Salvia Candelabrum*, which occur at the foot and in the lowest part of the Sierra, and whose stems were just beginning to shoot.

The first excursion which I made from Yunquera led me into the lowest parts of the mountain, toward the *nacimiento* of the Rio Grande. By this is understood the issuing forth of an entire river directly from a cavern in the rock,—the only rivulet of any importance in the whole mountain-chain of Yunquera, which is unusually destitute of water. Through a rocky side-valley, watered by the stream on which the little town stands, we enter on the romantic Barranco del Nacimiento, hemmed in on all sides by picturesque rocks, in the depths of which the water of the Rio Grande, constantly interrupted in its course by immense blocks of marble, apparently loses itself in milk-white foam. At the mouth of the rivulet of Yunquera is a spinning-manufactory belonging to the apothecary of the town, and this spot is the only locality for the rare *Scrophularia*

crithmifolia, Boiss., growing at the foot of the shady rock, which is kept perpetually moist by the spray from the foaming river, and of which plant I have only found a single specimen. On the same rock grows *Campanula Erinus*, L., in abundance, common on all rocks in the lower part of the mountain, as well as in the environs of Malaga; and at the foot occurred, frequent, *Scrophularia auriculata*, L., and various umbelliferous plants not yet in blossom.

From hence I started for the Nacimiento, accompanied by the apothecary and the physician of the town, both friends of M. Prolongo, and from whom I experienced the most hospitable reception. The path winds along the left side of the valley, one while over declivities of boulders, at another on the edge of giddy precipices. Here, upon sunny masses of rock, grows the charming *Linaria saturoioides*, Boiss., frequent, together with *Polygala saxatilis*, Desf. (*P. juniperina*, Cav.), *Echium albicans*, Lag., and the beautiful *Reseda undata*, L., a magnificent plant of two to three feet high, with close compact heads of large white flowers with purple anthers, which were unfortunately afterwards lost by accident, as well as some branches of the splendid *Lavatera arborea*, a large shrub of which I remarked in full blossom on a perpendicular, inaccessible wall of rock. In sunny clefts of the rock blossomed the shrubby *Anthyllis podocephala*, Boiss., a beautiful species with golden flowers, also *Micromeria græca*, Bth., *Lavandula multifida*, L., and other rock-plants. Higher up a perpendicular and lofty wall of rock, over which a little rivulet precipitates itself, stretches obliquely across the valley, and closes it abruptly; to the left of this rivulet, and on the right side of the valley, lies the Nacimiento of the Rio Grande. This is a spacious dark rocky cavern, the bottom of which is formed of a large basin of crystal water, from which the stream issues. The entrance of the cavern is overshadowed by old wild fig-trees, in whose shade grow *Orleya grandiflora*, Hoffm., *Scrophularia auriculata*, L., *Geranium Robertianum*, &c.

The next day I made an excursion to the Convento de las Nieves, a lonely convent situated at the foot of the Sierra de la Nieve, which rises in grotesque forms, some leagues to the north of Yunquera. It lies on the acclivity of a tolerably broad valley, filled with thick copse-wood, which passes over higher up into a deep rocky barranco. In the neighbourhood of the convent I found, upon dry grass plots, *Linaria tristis*, Mill., and the pretty *Trixago latifolia*, Rehb. The wood consists mostly of *Quercus Suber*, *Qu. Ilex*, *Qu. lusitanica* and *faginea* (*Qu. faginea*, Lamk., *Qu. valentina*, Cav.), which were just in full blossom; and below, *Qu. pseudo-coccifera*, Desf., *Qu. coccifera*, L., and *Qu. Mesto*, Boiss., a pretty shrubby oak with round thorny denticulated leaves, which was unfortunately not in flower. In this wood I gathered a *Coronilla* (♂), *Cephalanthera ensifolia*, Rich., *Orchis longicrucis*, Lk., *Scilla campanulata*, Ait. (*Hyacinthus cernuus*, Brot.), *Helleborus fœtidus*, L., common throughout the whole Serrania, which was here already out of flower, whilst in the alpine regions of the Sierra de Yunquera it had scarcely begun to flower. From hence I ascended to the Pico Jarro, one of the highest rocky summits

of the Sierra de la Nieve, which has a number of interesting plants. From a third of the way up was seen the pretty *Senecio minutus*, DC. (*Cineraria*, Cav.), in great abundance; higher up in the rock-clefts *Narcissus Jonquilla*, L., and the beautiful *Ranunculus blepharicarpus*, Boiss., as well as a very minute *Saxifraga* and *S. granulata* L. aff.; and on dry grass-plots on the summit *Arabis auriculata*, Lam., *A. verna*, R. Br., *Draba verna*, L., *Lepidium petræum*, L., *Sisymbrium rigidulum*, Lag., *Erysimum canescens*, Rth., various grasses, &c. From hence I returned to Yunquera, crossing many ridges and valleys of the mountain-chain, on whose steep rocky walls grows the pretty *Galium pulvinatum*, Boiss., in thick beds, which however was not yet in flower; I gathered also on the way a very narrow-leaved form of *Pinus halepensis*, Mill., in fruit and flower, which is frequent throughout the whole Serrania.

The two following days I devoted to a visit to the high mountain-chain of Yunquera. Accompanied by an experienced guide, I left Yunquera on the morning of the 27th of April, and soon entered the Barranco Bacamon, a narrow rocky valley, through which the mule-path ascends to the upper parts of the mountains, and where, amongst other rare plants, *Linaria tristis* occurs, but is very rare. The whole Sierra, as well as probably a great part of the entire Serrania, was formerly thickly covered with forests of *Abies Pinsapo*, Boiss. But these have been so destroyed that trees of this pine are now almost exclusively met with only in the higher mountain and alpine regions. At a height of about 3000 feet the acclivities of the valleys are seen covered with low pinsapo bushes. I remarked everywhere in plenty, *Scilla campanulata*, Ait., *Echium albicans*, Lag., various *Helianthema*, &c. After ascending for some hours we came to a wide, cauldron-shaped valley, open toward the east, called El Caucón, whose borders reached up to the alpine region. In the clefts of the rocks *Saxifraga biternata*, Boiss., occurs in luxuriant beds, a species diffused over the whole of the upper portion of the mountain, also *S. granulata* L. aff., and upon moist boulders *Veronica præcox*, All., *Cardamine hirsuta*, L., *Arabis verna*, *A. auriculata*, *Viola tricolor*, var. *arvensis*, and *V. Demetria*, Prol., first found here by Prolongo, a pretty little species with yellow flowers, which is met with in abundance throughout the whole of the alpine region of this chain. The south border of the Caucón terminates at its east end in an immense piled-up mass of rock, called Tajo de la Cáina, which is somewhat dangerous to explore. This rock is the only habitat at present known of *Centaurea Clementei*, Boiss.; it was just beginning to unfold its leaves, which are on both sides thickly covered with dazzling white wool. Between this rock, the Caucón and a second more eastern valley called Cañada la Perra, is a broad rocky ridge, on which, among other plants, occur in plenty *Taraxacum obovatum*, DC., *T. lævigatum*, DC., *Gagea polymorpha*, Boiss., *Narcissus Jonquilla*, L., and the pretty and very viscous *Saxifraga Arundana*, Boiss. In the upper parts of the Cañada la Perra commence the trees of *Abies Pinsapo*, which were densely hung with red male cones, and also *Quercus alpestris*, Boiss., which however were now entirely leaf-

less, quite in a wintery dress. Under these trees blossomed *Helleborus fatidus*, L., and *Daphne Laureola*, L., in great numbers.

From this valley we came to the highest ridges of the chain, which are broad, partly quite naked, and in parts covered with *Ptilotrichum spinosum*, Boiss., *Arenaria tetraquetra*, L., *Anthyllis Erinacea*, L., *Genista aspalathoides*, DC., *Juniperus phænicea*, L., and other alpine shrubs, all as yet without blossoms. In clefts of the Peñon de los Enamorados, an isolated rock, I found for the first time the pretty gold-flowered *Draba hispanica*, Boiss., which occurs plentifully on all the summits of this chain, and does not descend lower than 6000 feet. The upper ridges of the chain were still in part covered with snow. At a depressed spot, which derives the name of Hoya del Tejo from a large tree of *Taxus baccata*, L., I met with some few specimens of *Bulbocodium vernum*, L., in flower, near the edge of the melting snow in places thoroughly saturated with the snow water. Towards five o'clock in the afternoon we came to a basin of water, lying among limestone rocks and surrounded by very old pinsapos and alpine oaks, called El Pilar de Tolox, where we resolved to spend the night. Whilst my companions were engaged in preparing for our bivouac, I ascended alone the highest summit of the mountain Las Plazoletas, at whose northern foot lies the Pilar de Tolox at a height of about 7000 feet. There were few flowers, except *Viola Demetria*, *Lithospermum incrassatum*, Guss., and *Draba hispanica* on this giant mountain, the only locality of the *Pyrethrum Arundanum*, Boiss., which blossoms in August, and was discovered here by Prolongo. After a night passed merrily by the light of a large watch-fire, we started the following morning through a valley filled with beautiful pinsapo-woods, towards the Loma de la Alcazaba, a lofty mountain-ridge, which forms the eastern boundary of the above-mentioned central high table-lands, and on which grow *Taraxacum obovatum*, *T. levigatum*, *Lithospermum incrassatum*, *Narcissus Jonquilla*, *Gagea polymorpha*, *Draba hispanica*, *Veronica præcox*, *Lamium amplexicaule* var. *inapertum*, Boiss., *Androsace maxima*, L., *Viola arvensis*, *V. Demetria*, and a small yellow *Alyssum* in profusion; and, less frequent, *Thlaspi Prolongi*, Boiss., *Viola parvula*, Guss., and a small very white woolly alpine form of *Cynoglossum cheirifolium*, L.; and thence over the Cerro de los Pilones, overgrown with *Salvia officinalis*, towards the Puerto de las tres Cruces, where I found *Bulbocodium vernum* for the second time, on the edge of the melting snow. From this pass we descended to the Hoya de la Caridad, a hollow surrounded by limestone rocks, in the clefts of which *Thlaspi Prolongi* occurred in tolerable plenty; and from hence through a valley filled with luxuriant pinsapos, towards an immense mass of rocks, called Tajo de Pedro Muñoz, in the vicinity of which I found on the boggy meadow land *Narcissus pseudo-narcissus*, L., in great plenty. From this point we returned to Yunquera, traversing a lofty mountain-pass, through a narrow rocky valley, which bears the name of Las Angusturas de los Corales, where *Viola Demetria* and *Draba verna* occur plentifully, and *Lepidium heterophyllum*, Bth., rarely.

The environs of Malaga present at this season of the year a very

rich vegetation, the chief part of which however belongs to the general Mediterranean flora. A number of leguminous plants, *Cichoraceæ*, *Anthemideæ*, *Plantagineæ*, *Malvaceæ*, *Caryophylleæ* and grasses abound along the road-side and edges of the fields. Among the corn there were in flower *Papaver Rhæas*, *P. dubium*, *Ornithogalum narbonense*, *Vicia vestita*, Boiss., and many other species of *Vicia* and *Lathyrus*, various *Allia*, *Fumariæ*, *Convolvulus arvensis*, *Carduncellus cæruleus*, L., several *Centaureæ* and *Silene*, *Galium tricorne*, With., *Torilis neglecta*, Schult., *T. nodosa*, Gärtn., *Rhagadiolus stellatus*, Tournef., *Biscutella auriculata*, L., *Caucalis leptophylla*, L., *Medicago turbinata*, W., *M. Sphærocarpa*, Bertol., *M. tribuloides*, Lam., and grasses of the genera *Phalaris*, *Lolium*, *Festuca*, *Agrostis*, &c.—In hedges and on walls, *Spartium junceum*, *Acanthus mollis*, L., *Elæagnus angustifolius*, L., *Sinapis virgata*, Cav., *Phagnalon Lagasceæ*, DC., *Umbilicus erectus*, DC., *Asperula hirsuta*, Desf., *Bryonia dioica*, L., *Urtica membranacea*, Poir., various *Cardui*, *Silybum Marianum*, *Notobasis syriaca*, Cass., *Onopordon illyricum*, L., *Carrichtera Vellæ*, DC., and others. In sandy places on the shore and dried sandy beds of streams, there were in flower various species of *Andryala*, *Medicago littoralis*, Rohde, *Alsine marina*, Mnch., *Stipa tortilis*, Desf., *Malcolmia tricuspidata*, R. Br., *Astragalus pentaglottis*, L., *Erodia*, *Sileneæ*, grasses and the like; on the numerous vine-hills, *Fumaria parviflora*, L., *Ononis spinosa*, L., *Valantia hispida*, L., *Orobanche minor*, L., *Crucianella angustifolia*, L., *Rumex scutatus*, L., *R. Acetosella*, L., *R. bucephalophorus*, L.; upon fallow land, *Verbena supina*, Clus., *Anethum segetum*, L.; upon heaps of rubbish, *Echium violaceum*, L., *E. plantagineum*, L., *E. pustulatum*, Sibth.; in ditches and wet places, *Lythrum flexuosum*, Lag., *Briza virens*, L., &c. It would carry me too far to describe the vegetation of Malaga in all its varieties according to the nature of the ground; I will therefore content myself with mentioning here three localities, namely, the sandy and waste plain known by the name of the Dehesilla, which lies between the city and the Guadalhorce,—the hilly land encompassing the Vega of Malaga in the north and east, and stretching far to the coast eastwards,—and the Cerro San Anton, a lofty limestone mountain projecting above this hilly land, and about 1500 feet high.

Large portions of the Dehesilla, which I have many times visited, sometimes alone, sometimes in company with my friend Prolongo, are covered with *Ononis Natrix*, L., *O. ramosissima*, Desf., and *Euphorbia Paralias*, L. On marshy places and around ponds grow *Juncus acutus* and other species of this genus, as well as *Carices*, *Scirpus maritimus*, L., and among them *Chlora lanceolata*, Kœch, and *Samolus Valerandi*; in the drift-sand, *Lotus aurantiacus*, Boiss., in great plenty, also *Erodium hirtum*, W., *Festuca phleoides*, Desf., and other grasses, *Anchusa calcarea*, Boiss., *β. aspera*, *Centaurea sphaerocephala*? L., and *Thesium humile*, Vahl., rare. In the much-intersected hilly land, consisting chiefly of limestone debris and breccia, the greater portion of which is covered with vines, occur *Trifolium stellatum*, L., *T. striatum*, L., *T. angustifolium*, L., &c., *Medicagines*, *Filago gallica*, L., *F. germanica*, L., *Phagnalon saxatile*, DC., *Micropus*

erectus, L., *Evax pygmaeus*, L., *Ervum Ervilia*, L., *Asperula hirsuta*, Desf., *Cachrys pterochlæna*? DC., a small form of *Scabiosa stellata*, L., *Velezia rigida*, L., *Atractylis cancellata*, L., Silenes, leguminous plants, grasses, &c. On the vine-hills, near the convent of Los Angeles, lying half a mile to the north of Malaga, occurs the beautiful *Cleome violacea*, L., but not frequent; and on the neighbouring hills grow, in addition to the above-mentioned plants, *Cynara horrida*, DC., *Podospermum calcitrapæfolium*, DC., *Scorzonera hispanica*, L., *Chlora lanceolata*, Koch, *Linum strictum*, L., *L. tenue*, L., *Paronychia argentea* and *nivea*, *Gnaphalium luteo-album*, L., *Andropogon hirtus*, L., *Ononis picta*, Desf., and others; in fields in the neighbourhood of the same convent, *Scorzonera macrocephala*, DC., and *Phalaris nodosa*, L.; and in clefts in the limestone rocks of the Cerro Coronado, lying east of the convent, as well as on the rocks around the hermitages (Las Hermitas) lying to the west, *Campanula mollis*, L., *C. Erinus*, L., *Elaeoselinum Lagasæ*, Boiss., which was just beginning to unfold its umbels, *Alyssum campestre*, L., *Umbilicus hispidus*, DC., *Nigella damascene*, L., var. *minor*, and various grasses. On the northern acclivity of the lofty, steep and sterile hills, among which the Rio Guadalmedina, flowing through Malaga, winds, occur in plenty *Coronilla juncea*, L., *Lysimachia linum-stellatum*, L., *Convolvulus mænanthus*? Lk., a small *Stachys*, *Linum fruticosum*, L., and other mountain plants, and among them *Orchis papilionacea*, L., which had already ceased flowering at the beginning of this month; on the southern acclivity I gathered here the pretty *Leobordea lupinifolia*, Boiss.

The Cerro S. Anton, which I visited twice, is a steep limestone mountain, divided into two cones; it lies one league east of Malaga and a mile from the coast. On the way thither are found in the hedges gigantic tree-like shrubs of *Ricinus communis*, L., also *Kentrophyllum arborescens*, Hk., and here and there *Physalis somnifera*, L. Close to Malaga, on barren rocky acclivities below the castle of Gibralfaro, grows *Echinops Rufio*, L., and near the English church-yard the rare *Statice ægyptiaca*, L. On the south-west acclivity of the S. Anton grow various species of *Ononis*, and on their roots here and there the splendid black-red *Orobanche fætida*, Desf. On the western summit occur very rare *Ervum Lenticula*, Schreb., and *Minuartia montana*, Löffl. The eastern summit is somewhat higher, but has the same vegetation as the western, which descends toward the west in escarped rocks, in the clefts of which grow *Elaeoselinum Lagasæ*, Boiss., *Rhamnus pumilus*, L., *Lavatera maritima*, Gon., and *Silene velutina*, Pour. At the foot of these rocks, under low bushes of *Chamærops humilis*, is found the rare *Fumaria macrosepala*, Boiss., the only locality hitherto known for this remarkable species.